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*lacrimata* the twigs are glabrous or nearly so, the leaves with their narrow blades only slightly if at all pubescent, except on the petioles, and not glandular, while the pedicels and the hypanthium are glabrous. The types specimens (Biltmore Herbarium no. B 17 and B 969) are in the Herbarium of the N. Y. Botanical Garden.

The plants flower during the first half of April, good flowering specimens having been collected on April 8, 1899, while the fruits ripen after the middle of August and have fallen, usually before the first of September.

## REVIEWS

### Seed Plants\*

The first part of the "Morphology of Spermatophytes" deals with the Gymnosperms alone, and is presented as the outgrowth of a course of lectures and laboratory work at Chicago University. A chapter is devoted to each of the four orders, Cycadales, Ginkgoales, Coniferales and Gnetales. In the sections of these chapters on vegetative organs there are a number of half-tone habit illustrations from photographs but the majority of original illustrations are those of the development of the ovule and pollen grain in *Pinus Laricio* by Chamberlain.

The chapter on the Conifers is naturally the most detailed, both from the present importance of the group in the temperate zone, and since more morphological and cytological work has been done on it. The Gnetales are treated purely from comparison of literature owing to difficulty in obtaining material. The internal treatment of each group is what one would expect, dealing first with the vegetative organs including a limited amount of anatomy, more especially of the stem. The spore-producing members, the gametophytes and the embryo are the other sections of these four chapters. One realizes in comparing the review of the embryology of the four groups how much work is still to be done in tracing the stages of the development of the critical regions of the embryo itself. The authors have, it seems, not added to our knowledge on this point. The question of the possible homologies of the ovuliferous scale and bract is considered at some length and a working decision given in favor

\*Coulter, John M., and Chamberlain, Charles J. Morphology of Spermatophytes. Part I. Gymnosperms, 8vo., pp. x + 188. D. Appleton & Co., N. Y., 1901. Price, \$1.75.

of regarding the scale as a carpel rather than with Celakovsky, as an outer integument.

The remaining four chapters of the book are a comparative summary of those preceding, with two devoted respectively to fossil gymnosperms and geographical distribution. The fossil forms are treated practically from the standpoint of Scott and there are new illustrations of *Cycadeoidea* from the preparations of Wieland, of Yale. One looks perhaps for a rather more thorough treatment of the intermediate group of Cycadofilices from which, according to the authors, the cycads are derived through the Bennettitales, while the Ginkgoales and Coniferales originate through the Cordaitales. This phylogeny looks to the Filicales as the ancestral group of the Gymnosperms because of the close similarity of the Cycads and Cycadofilices.

The book serves as a very convenient and up to date summary of the literature of the subject; a separate bibliography is given for the five more important chapters and a complete bibliography at the end of the book. The references from the text are made, however, by numbers corresponding to the chapter bibliography, which is not as convenient for the reader as footnotes; and the chronological arrangement of even the shorter bibliographies seems unnecessary. The half-tone illustrations are not always as satisfactory as the older line work especially for anatomical reproductions (see Fig. 47), or for such morphological details as the seedling leaf forms (Fig. 42), of which the arrangement as a whole is excellent. The book undoubtedly provides a useful and concise review of the present knowledge of Gymnosperms.—

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*Practical Text-Book of Plant Physiology.* By D. T. MACDOUGAL, Ph.D. Longmans, Green & Co., 1901.

In this text-book the author departs somewhat from the usual arrangement of the subject found in the majority of plant physiologies. In the opening chapter on the "Nature and Relations of an Organism" are found excellently clear and concise definitions of such phenomena as rigor, irritability, tonicity, etc., which must be of great service to the student in forming a definite conception of these underlying and often not properly understood principles of plant physiology. Following this chapter are several on the relation of plants to various external agents. In the